



# Designing and Developing a Game-based Learning Experience for Healthier Eating

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## Introduction

- Eating disorders affect 7.8% of the U.S. population (28.8 million) as of 2018, more than doubling since 2000. They have the second highest mortality rate among psychiatric disorders after opiate addiction. (Arcelus et al., 2011; Galmiche, 2019)
- Intuitive eating, which involves listening to natural hunger/fullness cues while rejecting restrictive diets (Tribole & Resch, 2020), correlates with improved body image, self-esteem, overall wellbeing, and health (Linardon et al., 2021).
- Mindful eating means being fully present during meals and observing signals (Monroe, 2015)
- The transtheoretical model outlines stages individuals go through when adopting new behaviors, with promising results linked to interactive computer interventions (Prochaska, 1997)
- NutriQuest was therefore developed as an educational game promoting intuitive and mindful eating habits, leveraging the advantages of game-based learning for raising awareness and the principles of behavior change model

**Figures 1-4.** Gameplay screenshots (Game start, Cooking, Cooking success, and Cooking fail, clockwise from the top left)



## Methods

### Rapid Prototyping

- Rapid prototyping (RP) is a model used for an iterative development process
  - The process involves repeated cycles of designing, prototyping, implementing, and evaluating (Shakeel et al., 2023)
  - Allows failing early and making adjustments to balance scope and feasibility

### Development

- The game was developed using Python and Pygame
  - Pygame has modules tailored specifically for game creation (Ding et al., 2023)
- Code integrated into main GitHub repository to build full game

### Game Design

- The game has 12 stages, each with 2 gameplay steps
  - At the start of a stage, the player selects 3 of 20 available ingredients to try to cook one of the 20 recipes
  - Player must choose a correct combination of 3 ingredients to successfully cook food (5 attempts given)
  - Tips are provided about potential ingredient combinations and corresponding recipes
- 3 gauges (satiety, satisfaction, nutrition) measure player performance
  - Satiety increases when the player cooks and eats food successfully
  - Satisfaction only increases when eating in a proper focused manner
  - Nutrition increases based on healthfulness of the foods cooked
  - 8 potential ending titles to summarize player's approach and success
- Ending titles based on points accumulated across 3 gauges: from "Healthy Hero" to "Striving Beginner"

## Results / Future Directions

### A Journey to Find Game-conveyable Eating Philosophy

We initially aimed to promote mindful eating but realized the necessity of overcoming the restrictive diet mindset for sustainable healthy habits. After consulting a dietitian, we embraced the 'all food fits' principle from intuitive eating, emphasizing rejecting diet culture. Realizing the breadth of intuitive and mindful eating was too vast for a single game, we narrowed our focus to help players tune into their bodies' signals. This streamlined approach led to a more engaging and educational game, illustrating the effectiveness of simplifying complex concepts for enhanced learning.

## References

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